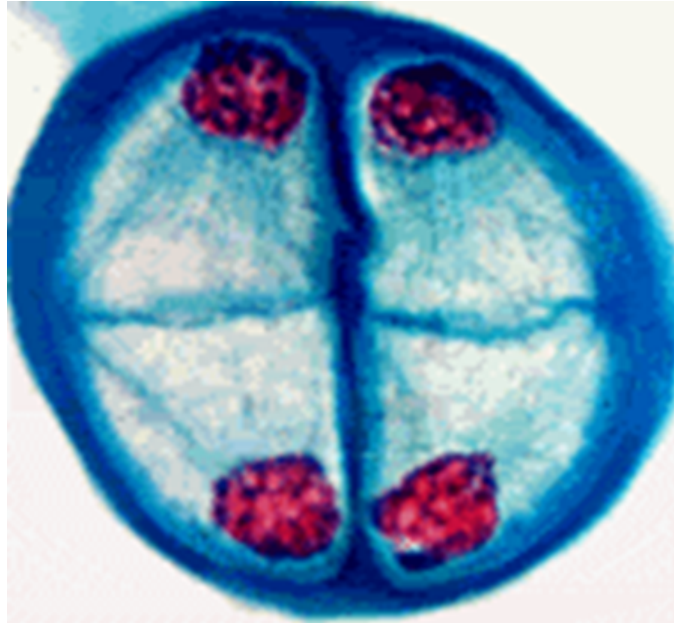
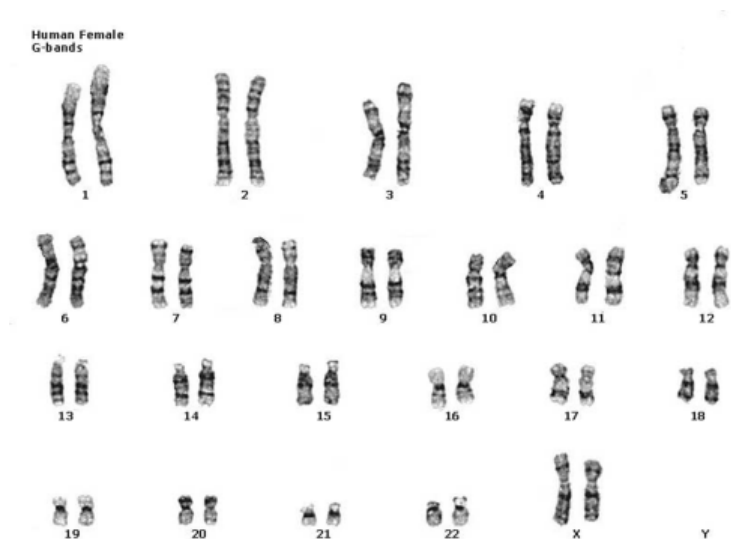


Meiosis Notes



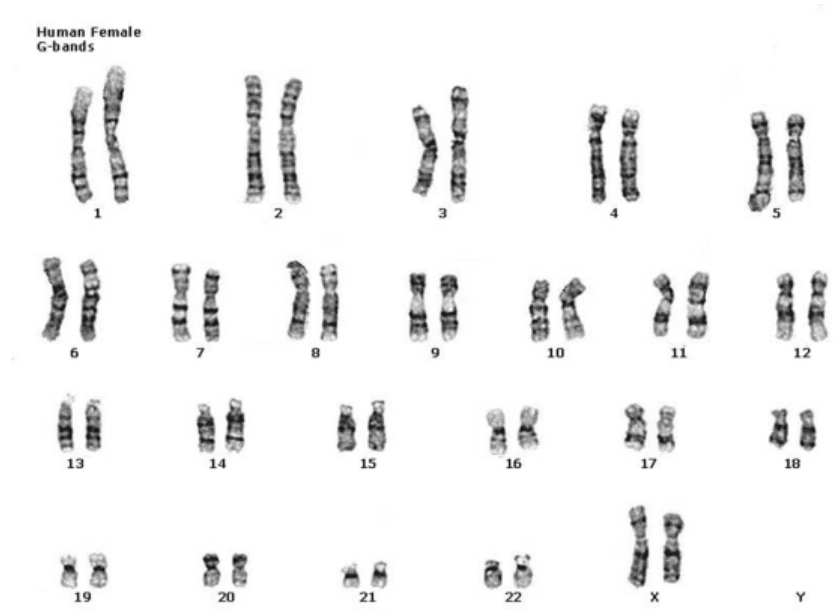
Consider this-

We each came from one fertilized egg cell. Humans have 46 chromosomes. When the egg and sperm combine, how do we always end up with 46 chromosomes?



Humans have 23 pairs of chromosomes for a total of 46.

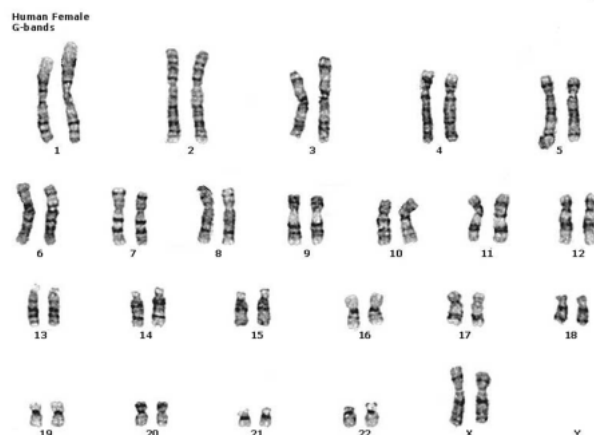
Why do chromosomes come in pairs?



One set of 23 chromosomes come from your mom and the other set of 23 chromosomes come from your dad

Cells that contain two sets of chromosomes are called **diploid** or 2N.

These two sets of chromosomes are **homologous** because they are the corresponding (same) chromosome.



Humans have 46 chromosomes or 2 sets of 23.

So, for humans, the diploid number, $2N=46$

A cell that has a single set of chromosomes is called **haploid** or N .

What is the haploid number for humans?

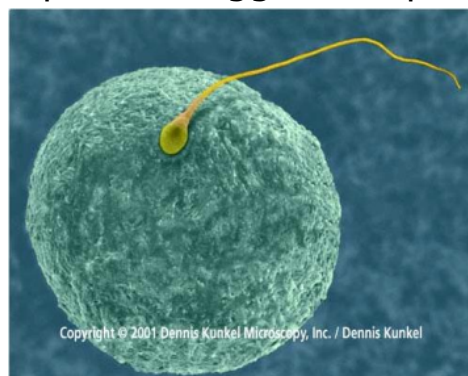


Meiosis

Meiosis is the process by which the number of chromosomes per cell is cut in half through the separation of homologous chromosomes in a diploid cell.

The purpose of meiosis is to produce eggs and sperm for sexual reproduction.

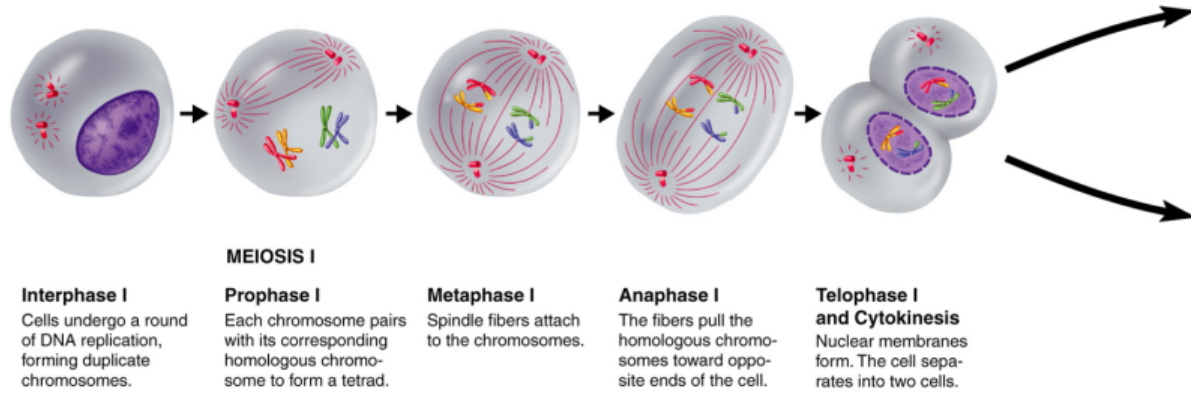
These reproductive cells are called **gametes**.



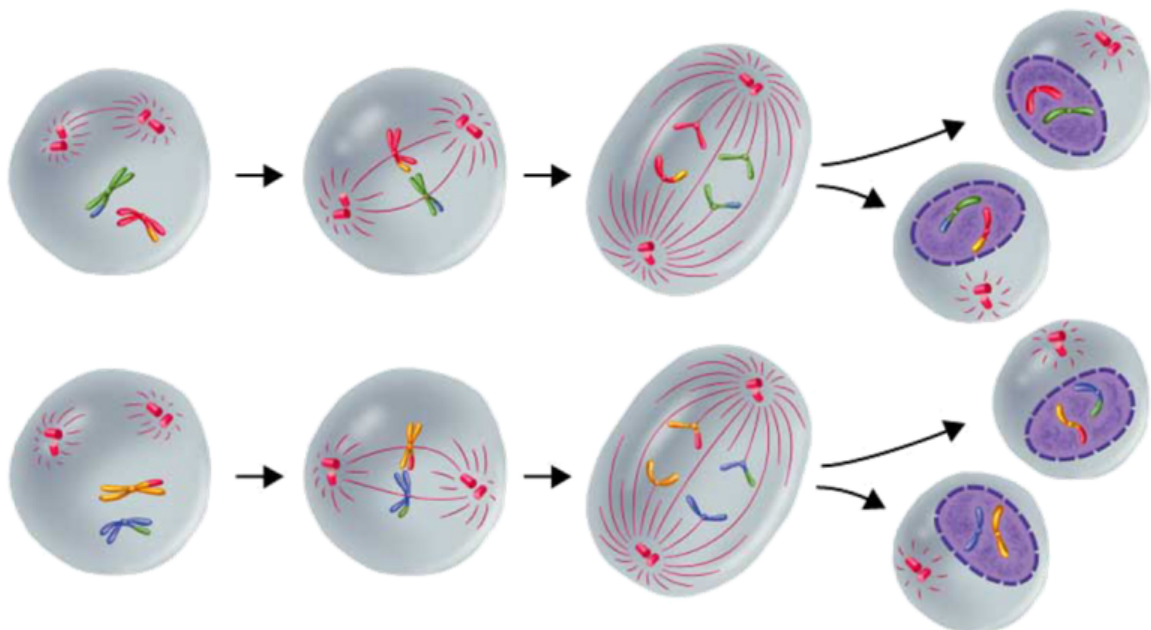
Caption: Human egg (ovocyte) and sperm (spermatozoon).
File Name: 979601A
Category: Medical
Type of Image: SEM
Magnification: egg x260, sperm x560 (Based on an image size of 1 inch in the narrow dimension)

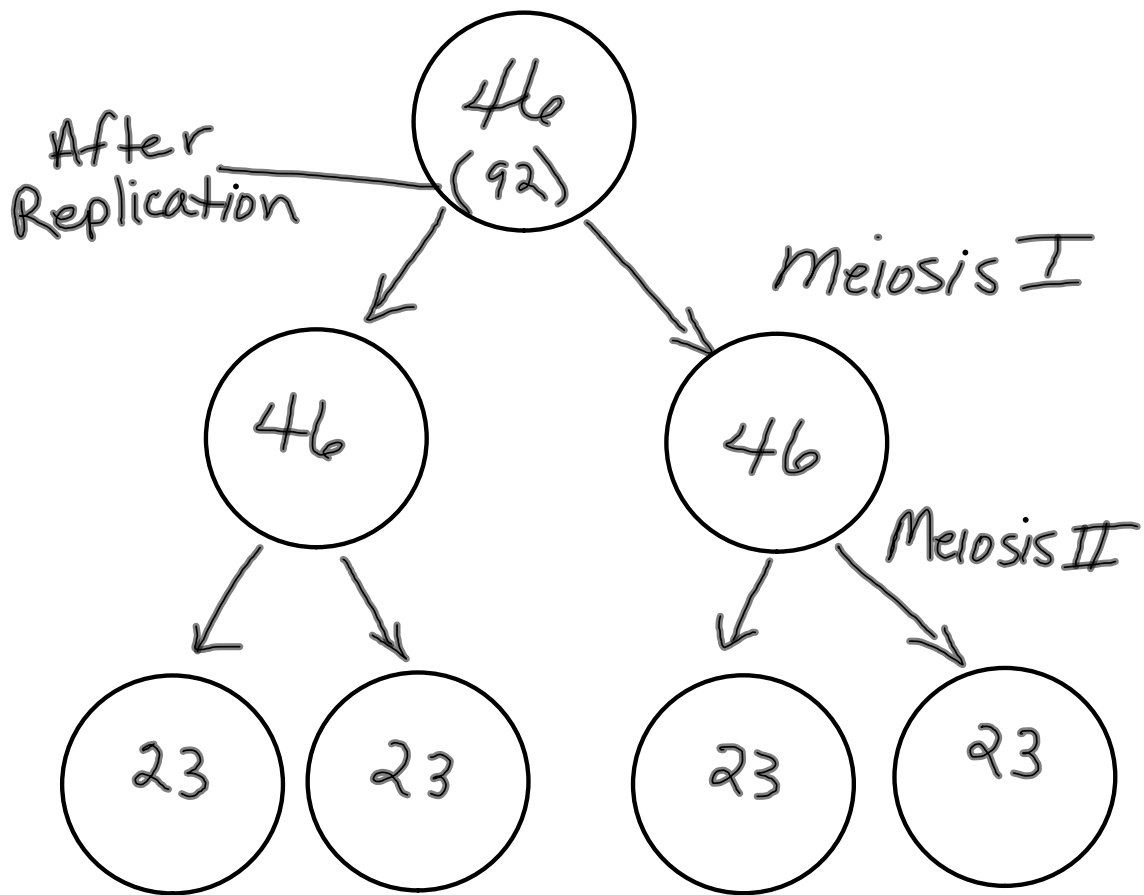
Eggs and sperm must have $1/2$ the amount of DNA in order for offspring to consistently have 46 chromosomes

Meiosis I



Meiosis II





During Prophase I, homologous chromosomes can be so close that they actually touch and can wrap around each other and exchange pieces.

This is called **Crossing-over**.

Crossing-over results in even more genetic variation among offspring.



Comparing Mitosis and Meiosis

Mitosis

results in the production of 2 genetically identical diploid cells.

Meiosis

produces 4 genetically different haploid cells.

NOVA ONLINE

How Cells Divide

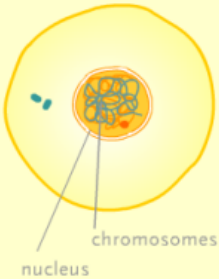
MITOSIS

Before We Split (1 of 8 steps)

Welcome to Mitosis vs. Meiosis. This half of the screen illustrates mitosis — the division of a cell's nucleus.

Along with cytokinesis (the division of the rest of a cell), mitosis results in a parent cell dividing into two daughter cells. The genetic information within each of these daughter cells is identical.

A human cell contains 46 chromosomes. To simplify our illustration, we'll show only four.




nucleus
chromosomes

MEIOSIS

Before We Split (1 of 15 steps)

Though the genetic code of a human being is contained within 46 chromosomes, only half of this number exists within the cell of a sperm or egg. If the cells didn't have half, a fertilized egg would contain 92 chromosomes and be untenable. Meiosis, a type of cell division specific to reproduction, avoids this by halving the number of chromosomes in a cell.

The cell shown here will divide twice, resulting in four cells. Each of these cells will have only half the number of chromosomes, but each chromosome will contain genetic information from both parents.



back ◀ ▶ next

Click on the next and back arrows to move through the steps.

<http://www.pbs.org/wgbh/nova/body/how-cells-divide.html>